The Voice of Iowa.

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MATHEMATICS.

Written for the Voice of Iowa, by G. W. H., Dubuque.

In the June number of the *Voice of Iowa*, I read an article on the "Utility of Classical Studies." In treating this subject, the writer rather depreciated the worth of Mathematics, as a mental discipline. He made a number of assertions which no one would attempt to maintain. It is not my object to write a review of what he has written; but I cannot allow such fallacies to pass by unnoticed. Many who have not had the facilities to become acquainted with the Classics and higher Mathematics, from that essay would get the idea that mathematical knowledge is of but little importance in the general pursuits of life, and that, as a mental discipline, the study of the Greek and Latin is *superior* to that derived from mathematics. Now, each of these assertions are equally false; and it shall be my object, in part, to show wherein the fallacy lies.

The science of Mathematics is of very ancient origin. It is impossible to trace out its history from its earliest cultivation; but we know it was one of the first sciences studied by the Ancients. And it must be acknowledged by all that it lies at the foundation of nearly every other science. On it is based all reasoning, both Analytical and Synthetical. Its principles are the first received by the child; the first to make an impression on the human mind. Indeed, we cannot conceive of any such thing as an *education* without it. Throw it out, and what have we left? A confused mass of matter, without form or arrangement; a chaos of disinterred ideas and uninformed principles. There can be no such thing in a civilized community as an utter want of its truths. Even the most ignorant minds are possessed of the primary principles. The advantages derived from its study are two-fold:

1st. The discipline of the mind;

2d. The practical knowledge gained which can be used in every-day business.

The term Mathematics means, the science of quantity. But this is not definite enough. It is both pure and mixed. Pure, when quantities are considered independently of any substance actually existing—as Algebra and Geometry; mixed, when the relation of quantities is taken in connection with the properties of matter—as Mechanics and Astronomy. In this science, two distinct methods of reasoning are used—the Analytical and Inductive. In the one, we reason from general principles to particulars; in the other, just the opposite. At the head of one stands Algebra; the other, Geometry. These two methods comprehend all that is necessary to be known by the logician. After the student has mastered Geometry and Algebra, then let him take up Whately, and he will at once master the different forms of syllogism; because he has already learned the art of reasoning in Euclid.

The question naturally arrises, which should be studied first, Algebra or Geometry, at the present time? I think in nine cases out of ten Algebra is studied before Geometry. Now, is this expedient? Will the mind most naturally receive the sciences in that order? If we are to form an opinion or theory from their history, we have strong reasons for recommending the study of Geometry first; Algebra afterwards. Arithmetic is the first of the Mathematics invented by the human mind. It is supposed to have been originally derived from the Hindoos, as some of their Astronomical observations date back 3000 years, B. C. From India, it was brought into Egypt, and from thence into Greece. We accordingly find the Arithmetician and Geometer, Thales, who flourished 536, B. C. He is the first Grecian Geometer of whom whom we have any knowledge. After him we have Pythagoras, Plato and, last of all, Euclid—his system of Geometry is complete within itself; nothing new has been added since his age. In England, and many other parts of Europe, Euclid was used for many years as the standard text-book on Geometry; and even at the present time it has an extensive use. From this we would infer that the human mind most naturally would grasp Geometry after Arithmetic. Algebra was not invented until about 700, A. D., and was not known in Europe before the 13th century. It was introduced into Italy in 1202 by Lenardo, a merchant of Pisa; but was not brought to any degree of perfection until more than two centuries afterwards. The Greeks,

a thousand years before, were skilled in Geometry, and had nearly perfected the "Conic Sections," showing clearly that this is the natural order of progression in the human mind. Sir Isaac Newton often complained that he had not studied Euclid with greater care in the early part of his life.

If we take the Mechanics as an illustration, we can readily perceive the peculiar adaptedness of Geometry to the young student. I believe it is a fact that cannot be overthrown, that the elements of Mechanics are much more easily understood when treated Geometrically. American authors have adopted both method of demonstration. Olmstead and Jackson use the Geometrical method; Bartlett the Analytical; Hultin, an English author, uses both. The great work of Sir Isaac Newton, the "Principia," is written on Geometrical principles. Poissen, a celebrated French author, uses the Inductive method for demonstrating some of the fundamental principles; but the greater part of his work is written Analytically. Laplace, in his master-piece. the "Mecanique Celest," uses the Analysis. When the student has acquired the first principles of Mechanics, he should study it Analytically; for, after Algebra was perfected, that method of reasoning entered in a great measure into the higher Mathematics. In fact, Analysis is the very nature of the Calculus. The order of Nature seems to be the best adapted to the wants of the human intellect; and hence, in the pursuit of knowledge we should observe this order as far as practicable. The science of Mathematics is linked together in one complete chain; every link has its place, from the smallest to the largest. Now, if we change the order of the links, we take away its symmetry and destroy its former beauty. So, if we study Algebra before Geometry, we violate the order of Nature and impair the chain of reasoning.

1st. *Its discipline of the mind.*

There is no science that comes within the range of man's intellect that in so great a degree matures the reason, cultivates comparison, and strengthens the judgment, as Mathematics. To prove this we have recourse to biographical example. We quote men whose minds in youth were disciplined by the study of this science. Lord Brougham, that giant intellect, who astonished the world with his knowledge and moved the multitude by his eloquence, when 18 years of age, entered the University, and paid the greatest attention to the study of Mathematics. His writings on this subject were published by the Philosophical Society, which show him to have

been no common mathematician. He afterwards studied law, and became eminent as a lawyer and politician. Subsequently, he was elected a member of the House of Lords. Horner, in speaking of him, says: "He unites the greatest ardor for general information in every branch of knowledge, and, what is more remarkable, activity in the business, and interest in the pleasures of the world, with all the power of a mathematical intellect."

Whitney, in his early youth, had no desire for any study but Arithmetic, and, when in college, preferred the Mathematics. He afterwards invented the Cotton Gin, by which he added "forty millions annually to the resources of his country."

Napoleon was a great lover and student of this science, and always arranged his army on mathematical principles.

John Playfair, the great English Theologian, was distinguished as a Mathematician.

Barrow, whom Charles II pronounced an *unfair* preacher, because he "so exhausted the subject as left nothing for others to say," was a Mathematician second only to Newton.

And all these are examples of men who were not *professed* Mathematicians—those who had resourse to it as a mental discipline and a useful attainment.

2nd. *It lies at the foundation of nearly all science.*

In the study of Chemistry we begin with simple elements, and then pass to compounds. Here, it is necessary to call to our aid mathematical principles. We find all compound bodies combined in certain fixed proportions. We turn to the gasses, and find that they expand after a fixed law. We examine the flame of a lamp and it too is formed on mathematical principles.

It enables the geologist to classify the stones he picks up, and to calculate the density and temperature of the bowels of the earth.

The engineer can learn from it where to run a railroad or canal with the greatest facility and the least cost. He can determine the height of a mountain or the width of a river without measuring it. It enables him to calculate the pressure of water against the sides of a canal. And in the construction of locks, then higher mathematics is of the utmost importance, he must calculate at what angle to incline the gate so as to resist the greatest pressure and yet present the least surface.

The Architect, if he would work understandingly, must be a familiar friend of numbers. If he wishes to build a suspension bridge

he must know that it takes the form of a Catenary, and by the help of the higher Mathematics he can calculate the tension of the cables and the maximum weight it would be able to support. In the construction of the Groined Arch we have a beautiful illustration of the application of its principles to the arts.

The carpenter lays out and frames his building on geometrical principles—every brace must be of the proper length. He would know the length of the rafters so that the roof may have the least surface and yet sustain the greatest pressure. He also learns that the winding stairs is a spiral and builds it accordingly.

To the practical mechanic it is of the greatest importance. In the construction of machines, he needs mathematics at every step; every wheel, axle, screw and lever must be of proportional size. Even the cogs must be cut in the form of a Cycloid. We also find that many of our greatest mechanical inventions were made by men whose minds were disciplined by mathematical studies.

In the Mint its principles are indispensable. The metal must be mixed in just the proper proportions to give it a standard value and the requisite hardness. Then another question arises:—What must be the shape of the coin so that it will contain the greatest amount of metal and leave exposed the least surface. This is a problem of the greatest practicability. By its solution thousands of dollars annually are preserved. Investigations in the calculus tell us that a sphere will contain the maximum of solidity with the minimum of surface—next to the sphere, a cylinder of equal base and altitude; and consequently for the sake of convenience we use a flat cylinder. Now these are all practical problems, which come in the business of every day life. And it is of the greatest importance that they be understood.

3rd. *It prepares a man for the business of life.*

We take the merchant: he buys a cargo of goods in Europe, and wishes to ship them to Boston. In the first place he must calculate what will be the cost of the cargo, what the expenses of transportation, the time that must elapse before their arrival, the duties, the interest on the capital laid out, and last of all what they will bring in Boston market. From this he will determine his profits, As it is by previous calculation that nearly all mercantile operations are carried on, what can be of greater use to a man in any business than reason, comparison and judgment. And it has been shown that mathematics developes and strengthens each of these

Erskine, one of the most distinguished of English lawyers, carried Euclid in his pocket, and gave as a reason for so doing "that it was the best book on logic," and just what he wanted. It is a fact worthy of notice, that many of our greatest lawyers read Euclid once a year, in order to acquire habits of close reasoning.

Cuvier invented the system of comparative Anatomy on mathematical principles.

Boerhaave, that name pre-eminent in medicine, studied mathematics with the greatest ardor. In an oration before the University of Leyden, he said, "all the knowledge we have is of such qualities alone as are discoverable by experience, or such as may be deduced from them by mathematical reasoning." And this is the simple truth known and acknowledged by all improvers of science.

It has been said that Turgot and Laplace, eminent mathematicians, were not capable of holding a political office. I grant this true; but are we to take isolated examples, and on them base our arguments, if so we will most assuredly err. Now it can be shown that in nine cases out of ten distinguished mathematicians were prepared for any position in life. And that mathematics generally fits a man in an eminent degree for general business vocations. I will quote a few examples of distinguished mathematicians.

Newton, (that name never to be forgotten,) was elected and served his term in Parliament in 1688. In 1695, he was appointed Warden of the mint, and in 1699, he became Master, which office he held until his death. In this position he was eminently successful; his great knowledge of the mathematics enabled him to compound the metal in the exact proportion to obtain the greatest durability.

Descartes, the great Algebraist, was a soldier.

Copernicus, a name familiar to all lovers of Astronomy, was also a physician.

Lugrange, the greatest mechanician of the 18th century, held office of trust under the government.

Lord Napier, the inventor of Logarithms, was not only a mathematician, but a politician.

Nathaniel Bowditch, the most distinguished of American mathematicians, "was an eminently practical business man."

The name of the late Francis Arago needs only to be mentioned to be known. And these are but few of the many examples that

might be enumerated. We have had enough to prove clearly that mathematics prepares a man for almost any business.

We have as yet said nothing of the superiority of mathematical mind over all other. We cite as an example Bode, a German astronomer, who by the aid of mathematical science, predicted that there must be a planet revolving between the orbits of Mars and Jupiter, though it had never been seen by the ken of mortal vison. Yet he announced that it was there, for mathematics said so. And years afterwards astronomers discovered and are still discovering the fragments of the former planet. Again in 1845, the attention of astronomers was called to the fact, that the motion of Uranus was disturbed by some cause beside the attraction of Jupiter and Saturn. Leverrier collected all the observations and by his great knowledge of mathematics pointed out the exact spot in the heavens where there must be a planet. Astronomers directed their telescopes to this point and found it within one degree of the place he had designated. Can any one doubt the worth of mathematics, either as a mental discipline or a medium for obtaining practical knowledge? This science is so intimately connected with everything in nature, that it cannot be separated without destroying the harmony of the whole. Light itself obeys its laws; the rainbow is formed on purely mathematical principles. The refraction and reflection of light are always in a constant ratio. The air too is not exempt from its laws; its density decreases in a constant ratio as we ascend. A stone thrown from the earth describes a parabolic curve; even the inferior order of animals make use of its principles. The honey-bee builds its cell in the form of a regular hexagonal prism, which has been demonstrated by mathematicians to be the form that will contain the greatest amount of honey and require the least possible expenditure of wax. The bird cleaves the air in the form of a cycloid, thereby suffering the least resistance. The dog knows that the hypothenuse of a right-angled triangle is less than the sum of the other two sides, and hence he cuts across lots.

The student who pursues the study of mathematics must reason at every step; from arithmetic to calculus there is one continued chain of reasoning. But is it so in the study of languages? True, there are great advantages derived from a knowledge of Greek and Latin. But the question is: *How far do they discipline the mind, and increase our practical knowledge.* I would ask, how much reason it requires to learn the declension of the Latin and Greek nouns, pro-

nouns, adjectives, &c., and the conjugation of the verbs. Does it not appeal directly to memory, and nothing else? What else beside memory does the student need in learning the Greek verb Tupto. He begins first to learn the rules for the formation of the roots and augments, then the tense signs, then the terminations, and last of all he learns the verb with all these parts combined; when he comes to translate, the most important part is the memorizing of words, and after a time the student can read Latin or Greek without referring to his Lexicon for a single word. Now here we have a limit; we can go no further if we wished. But is it so in mathematics? most assuredly not. There is no such thing as a stopping point; the mind might pursue this science throughout eternity and yet find new truths and new principles. It is like a diverging infinite series—the further we go, the wider the field, the more expansive the view. It is then preposterous in the extreme to say that the benefits resulting from the study of language are equal to those derived from the study of mathematics.

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Written for the Voice of Iowa.

PROGRESS OF ART AND SCIENCE.

Becoming recently somewhat acquainted with the great scheme now proposed of making a revolution in the art of writing and printing, I was naturally led to inquire into the practicability and utility of such a project.

As it has for its object, to smooth the rugged path along which the student is obliged to travel in the pursuit of knowledge, and for its element upon which to act, the energy, activity, enterprise and ingenuity of a free, liberal, enlightened and progressive community, we are inclined to predict that its success is certain, and its triumphs will be complete. We are in the habit of honoring and eulogizing those who have been instrumental in enabling us to accomplish our designs with much less than ordinary physical labor—why not bestow the same (or even more) on those who have been able to relieve us of proportionate mental drudgery. I am of opinion that it is the prevailing fault of ancient authors to veil their teaching in obscurities and mysteries. But at present there is almost daily

some improvement discovered by which we are relieved of either physical drudgery or pecuniary expenses. We should hail with joy and appreciate any improvement by which the mind may be liberated from the long and tedious routine to which it has ever been subject, and be enabled to cast off those shackles with which it has been so long bound.

The subject naturally leads us to consider the subject of education —one of the greatest subjects that can engage the attention of man; and, indeed, such is its importance that no person can be otherwise than interested in its success and its rapid progress. Its general diffusion must be congenial to the wishes of every individual who honestly and intelligently labors for or desires the good of the human family.

Man is emphatically the creature of habit, and habit is but the result of education. To educate is to increase in knowledge; to increase in knowledge is to increase in power. Then it follows as the legitimate result, that in proportion as individuals, communities or nations advance their educational interests, in that proportion will they advance in the path of virtue and liberty, independence and happiness, and must arise in the respect and esteem of all with whom they may be socially or politically connected. In a moral point of view, it transforms man more and more into the image of his Maker, and renders him more susceptible of a high degree of happiness. Man is the creature of education. By it he rises step by step from being one of the most helpless creatures imaginable, to that exalted state of intellectual existence, and to that degree of importance, to which no other earthly creature can ever attain.

Instinct teaches to the inferior animals, even in the first stages of their existence, the faculty of providing for their wants to a great degree—it teaches them in their infancy almost all they ever know; while to man it teaches comparatively little or nothing. But he is capable of improving from time to time, upon every discovery and every accession to his store of knowledge, and transmitting them to his posterity for the benefit of generations yet unborn.

Man's mode of subsistence in his primitive state must have been very rude and simple. Being unacquainted with the arts and sciences, we must suppose that he enjoyed but few of the conveniencies that we now enjoy. But we find him existing on the earth, created after the image of his Creator, with much power and dominion over the creatures—endowed with an immortal spirit destined to

exist forever after his material body has returned to dust from which it was taken, we find him endowed with certain principles that render him a reasonable, intelligent and accountable being. He is endowed with the principle of reason, by which he is enabled to reflect from cause to effect, and from effect back to cause; the principle of memory, by which he is enabled to recall to his presence the image of things that are past; with conscience, that principle which dictates to him the difference between good and evil. These, with some others, form the constitution of the mind of man. As a reasonable and intelligent being, then, we are not at all surprised that he should look with wonder upon the beauties of Nature spread out before him—a broad field for his investigation. The variety of objects and scenes attract his attention, and he begins to reason. He goes forth and takes a survey of the field before him, explores it to its utmost bounds; the angry waves of the mighty deep do not confine his researches; he builds him ships and launches forth on the pathless ocean, discovers the islands of the sea, searches out unknown continents and calls them by their names; he speculates on the size and shape of the world he inhabits until he becomes satisfied that it is a vast globe, 8,000 miles in diameter; he traces out the boundaries of the great deep, finds that Nature has made certain divisions in it, delineates their shapes and comparative sizes on paper, reduces his investigations to a science and calls it Geography. He must have necessarily been early acquainted with the fundamental rules in numbers; he could not engage in the most ordinary occupations of life without observing them. These, becoming the theme of his investigations, became the fruitful parent of an innumerable progeny. From these he discovers uniform rules by which to carry out his praetical illustrations. He finds figures of all shapes and sizes, globes, squares, solids, angles and triangles, and the whole theory of numbers arise before him with its long array of proportions, ratios, roots and powers: and these again becoming the theme of his investigations, lead him on step by step until he is not only able to compute the dimensions of the world he inhabits, and all the figures it contains, but he is enabled to render the existence of other worlds at least highly probable. These investigations he also reduces to a science, and calls it Mathematics. Again, he notices that the earth is composed of different layers or stratas, which have the appearance of having been once regularly and systematic-

ally placed together. He classifies them and gives them their names and definitions, and calls the science Geology.

He sees that the particles of different bodies have an affinity for each other, and that being mixed in certain proportions they will enter into new combinations and form new compounds; these he follows through all their complexities and describes the laws they observe, and calls the science Chemistry. He discovers there is an invisible cord drawing all things to a common center; this he calls the force of gravity, and ascertains that all things are governed by the inflexible laws of nature. Then he goes on from science to science, until he is familiar with the world he inhabits, and all it contains. But can this little sphere gratify his growing curiosity, or satisfy his grasping desires? Oh, no; the mighty energies of the human mind are not to be confined to a compass so small. He mounts on the wings of sciences, spurns the bounds of feeble sense, overleaps the hitherto formidable barriers of ignorance, superstition and skepticism, and is seen gliding like a fairy spirit from planet to planet, and searching out that which has been hidden from him ever since creation first began. He discovers other worlds; proves by the force of mathematical demonstrations that they do exist beyond a doubt; computes their actual sizes and relative sizes to each other; ascertains that they perform certain revolutions, and the time of performing the same. He measures their distances from the great common center, their distances from this globe, and their distances from each other. And should he be inclined to doubt for a moment the accuracy of these calculations, we have only to remember that it is by them that we know at what time, for months or even years, the exact minute that an eclipse of the sun or moon will take place, and how long it will continue.

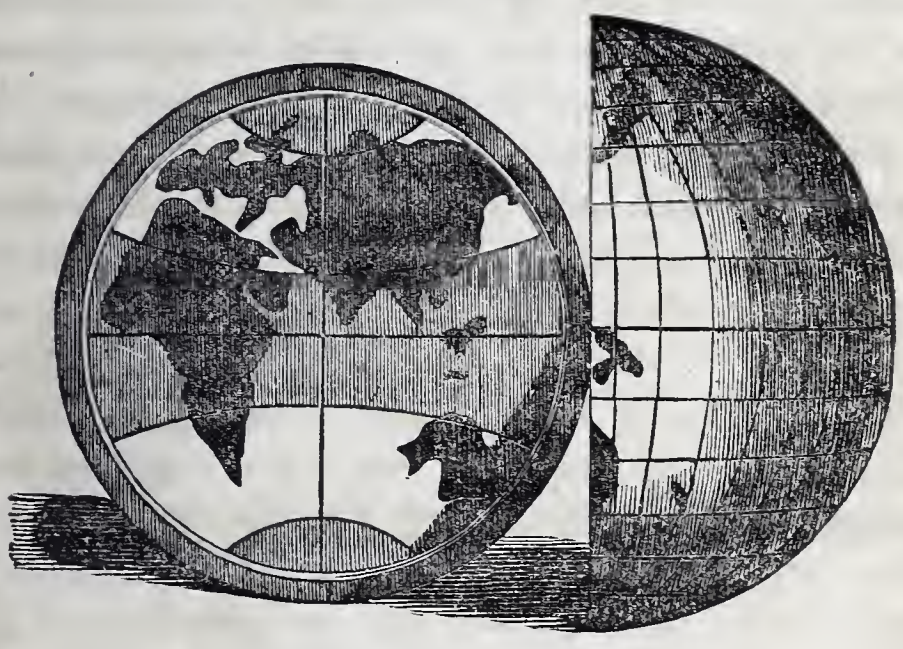
We have said that knowledge is power. Power, when founded and attained on virtuous principles and controlled by the same, can never fail to be a blessing to an individual, a community or a nation; a correct knowledge of the arts and sciences, naturally beget these principles, and inculcate no others. In proof of this it is only necessary to refer to those mighty nations now numbered with the things that were; whose greatness lives only on the pages of history, or among the magnificence of their ruins. Where is Egypt that in producing Euclid produced the father of mathematics? Where is Carthage, and Troy who sustained a ten years' seige against the Greeks? Where is ancient Greece, and Thebes with her hundred

gates, and Rome and Babylon? who by turns have been the metropolis of the world. They have all passed away with all their grandeur and glory, and while the places of some can only be found by their stupendous pyramids or the remains of other great works of art. Others can be found only in imagination or in the poet's song.

In the history of those nations we notice that in proportion as they encouraged the useful arts and sciences, in that proportion they uniformly arose in the scale of true national happiness and independence. On the other hand as they neglected them they inevitably, sooner or later, sunk in the scale of national existence. It has happened, however, that nations have arisen suddenly to power and glory by the force of military prowess; but such examples have served only to show the contrast between the two moving principles. The former may be compared to the sun, from whom we receive heat and light, and whose genial rays cause the earth to bring forth fruit in the proper season, and who holds the planets in their orbits and preserves the equilibrium of their motions. While the latter may be compared to a wandering comet rushing madly through the system without order or a precedent, attracting other planets from their paths and leaving them to regain their wonted balance, as best they can; but it is gone, its brilliant career is past, and but for the pen of the historian, the next generation would be ignorant of the fact that it ever existed. It has ever been the object of military and kindred rulers to keep the mass of community in ignorance, that it may be the more easily controlled to suit their selfish caprices, and ambitious whims. While it has been the object of the arts and sciences to infuse into the minds of all the true principles of self-government—the only firm basis on which a free and happy government can exist—by teaching man to think and act for himself, independently of the dictates of others, they teach him his own natural resources and capacities, without which he would not be able to appreciate, improve or enjoy the blessings of liberty, even were he to possess them. They contain the vital principles of liberal government and free institutions; they contain the very elements of union and harmony; they beget similarity of opinion between individuals and friendship between nations; they dispel ignorance and superstition and compel skepticism to bow in submission; they make the crooked paths straight, and bring truths to light, that but for them might have forever lain in darkness; they have a direct ten-

dency to destroy aristocracy and break down the distinction of caste, and bring all to a common level; they lessen crime and misery, and suppress tyranny and oppression; they restrain the evil passions, and encourage the virtuous ones; they give us a more exalted idea of the wonderful works of nature, and of the character of nature's God; they inculcate all those principles which are the only means by which man's true character, as a reasonable, intelligent and an accountable being can be made to appear a blessing to himself, and without which no enlightened or republican government can be perpetuated or even exist. Then what honors too high to be bestowed on those who have devoted their time and talents in the promotion of this great cause, and who have toiled and labored to discover ways and devise means by which the spring of knowledge may be made accessible to all; then instead of asking what have they done for us, we may well ask what have they not done. A. S. I.

HEMISPHERE GLOBE.



HEMISPHERE GLOBE.

In a late number of the *Voice*, we presented briefly some suggestions in the use ef the Globe. Following out those, the pupil will have gained an understanding of the rotundity of the earth, but will not be able to reconcile the impressions given on the maps

with those given by the globe. The map of the world shows two North and two South poles—the globe *only one* of each; and the globe is the acknowledged standard. The map shows curved lines; on the globe all lines are straight. On the map, a part of Asia is separated from the rest, but the globe represents Asia as a whole; while the Pacific islands, which, on the globe, lie near each other, on the map appear at different sides of the earth. The mind of the child asks—Why these differences? And teachers know by wearisome experience how difficult it is to reconcile such impressions. Some teacher, putting into practice a happy suggestion, inverted the Hemisphere Globe, which affords a most complete solution of such knotty problems. On its exterior surface is the globular map, or globe representations, and on the interior, the plane map, or map of the world.

I. If this is opened and removed across an ordinary room, with the globular surface presented to the eye, it will appear flat. Let the children understand that the maps are drawn as if seen by the eye at such a distance that the round surface of the earth would appear flat.

II. Again show the class one of the hemispheres on the outer surface; let them imagine it elastic and capable of being pressed flat; then, on opening the globe, present the plane surface it would assume if flattened, *i. e.*, the same hemisphere in the map. They will readily see that the lines must assume the circular form, and must approach nearer each other in the centre, thus making the parallels of latitude widest at the circumference of the map.

III. Or, present the map side and show the *four* poles; close the globe and it will at once be seen how the four poles arise from two only. Likewise, those parts of Asia, and the Pacific islands, so far separated, will be seen to be really joined, and the map representation to be a correct one, *when correctly understood.*

It may be used also to illustrate the spherical form of the earth, as follows: On the flat surface show that if the earth were flat, a person at the equator, or even at the south pole, could see another person at the north pole. Tacks may represent persons. Then, with the globe closed, show that if the earth is round, a person south of the equator could *not* see another at the north pole, because the earth would rise up between them.

As the pupils advance in years and attainments, the conversational method of teaching geography must be changed to one re-

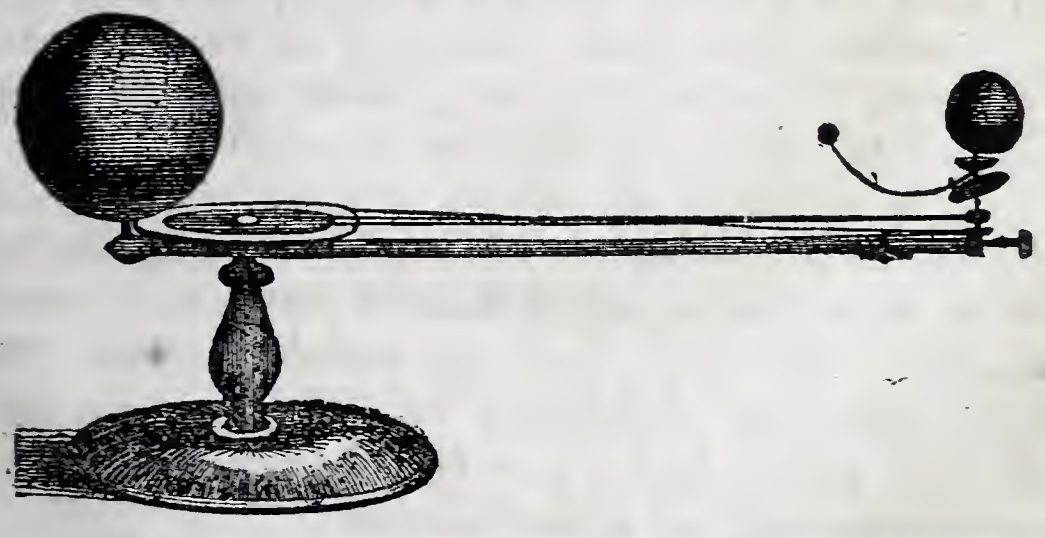
quiring more actual study by the pupil. The principal object sought should be to fix in the mind of the scholars the forms and localities of the various divisions of land and water, giving comparatively little descriptive geography to be learned.

For this purpose, the study of the map affords the best means, and especially is this true of outline maps. Pupils should learn to copy with care and accuracy maps, as a daily exercise, and at recitation, or other times, some of the best ones may be placed on the blackboard entirely, from memory.

USES OF THE TELLURIAN IN SCHOOLS.

On visiting our schools a large proportion of the geography pupils will be found, who can readily answer questions in regard to the seasons. Spring, Summer, Fall and Winter are familiar. They will tell you that the earth performs a revolution around the sun once in three hundred and sixty-five days; that it turns on its axis once in twenty-four hours; but the really important questions, *how* these revolutions are, and how these various effects are produced, remain to most a hidden mystery.

For the purpose of illustrating all the phenomena resulting from the relations of the sun, moon and earth, to each other, nothing can be found more valuable than the Tellurian, which is represented by the following cut:—



The cause of day and night, the change of seasons, the different lengths of day and night, the rising of the sun North of East in

summer, the changes of the moon, solar and lunar eclipses, the difference of a solar and sidereal day or year, spring and neap tides, and various other phenomena may all be explained by the use of this instrument with such clearness and simplicity, as to make them interesting, and within the comprehension of the whole class.

The manner of adjusting the machine, can be seen from the cut; there is, however, some variation in the construction of the instrument, as some are made with three cords, and others have but one, but the purposes served by both are the same. By turning the arm around, the sun and earth revolve around a common center of gravity, the moon revolves around the earth and the parallelism of the earth's axis is maintained, always pointing towards the North.

The succession of day and night may be represented by placing a lighted candle near the sun, on the large fixed pulley, in a darkened room; this half of the globe will be in light and half in shade. The illustrations can be made equally clear by the use of the day circle, the half of the earth turned toward the sun representing day and the other part night. By designating any place of residence, it will be seen to come in light as the earth revolves, making the sun appear to rise, and passing over its meridian, disappear, or set in the West.

To explain the *variation in length of day and night*, we can turn the arm of the Tellurian so as to bring the globe directly West of the yellow ball or sun, both poles will be the boundaries of the light of the sun, and all parts of the globe will come successively and equally into light and shade, when it is made to revolve equally on its axis. The days and nights at this point will be equal all over its surface. Hence, the East and West points of the earth's orbit are called equinoctial points or equinoxes, from *equas*, equal, and *nox, noctis*, night. But as the earth passes on in its orbit from the western equinox towards the South, since the axis continues directed toward the North, the light will gradually extend over the north pole, and recede from the south pole. The northern hemisphere will thus become more than half illuminated, and the southern proportionally less. Now, it will be perceived that any place north of the equator will remain longer and longer in light at each diurnal revolution, as the earth advances, until it arrives at the southern point of its orbit; here the light will extend over the north pole twenty-three and a half degrees, and fall as far short of the south pole, giving the longest possible day to the northern hemisphere,

and the shortest possible night; but in the southern hemisphere, the shortest day and the longest night. It will be seen also that all places north of the Arctic Circle, will make more than one entire revolution in light, and thus have a day of more than twenty-four hours in length.

Again, turn the arm and carry the globe through the northern part of its orbit, and it will readily appear why the inhabitants of the northern hemisphere have nights longer than days in that part of the earth's orbit. It will also be apparent that both poles must have days and nights of six months each.

The cause of the *change of seasons*, will readily be seen by observing the position of the earth in relation to the sun while performing its revolution in its orbit.

If the arm of the Tellurian is directed towards the south, the the earth's axis will be inclined towards the sun, and a line extending from the earth's centre to the sun's centre will pass through the tropic of Cancer. Hence, an observer on that tropic would at noon see the sun directly over head, when the sun and earth are in this position with regard to each other, and all the inhabitants of the northern temperate and frigid zones, would see the sun at its greatest altitude. This must be midsummer; and the sun is more nearly vertical when over the meridian, at all places north of the tropic of Cancer, than at any other time of the year. The arm being moved toward the east, as the inclination of the axis continues toward the north, it becomes less and less inclined toward the sun. Being at the eastern point, it is neither inclined to nor from the sun, but the extremities or poles are equally illuminated. The sun, now vertical at the equator, is "crossing the line."

Again, as the earth continues in its orbit, the north pole is carried into darkness, while the south pole is brought more and more into light. When the earth reaches the north point of its orbit, the axis is inclined away from the sun, and the southern hemisphere is more directly under its influence. The sun will now be vertical at the tropic of Capricorn, and shine a longer portion of the twenty-four hours on the southern hemisphere, and with a greater intensity; while the rays are more oblique on the northern hemisphere than at any other time of the year. Here, then, must be winter to the inhabitants of the northern hemisphere.

If we follow the sun in its orbit to its west point, we find it oc-

cupies the same relative position in regard to the sun as was seen in the vernal equinox.

The reason why *the sun rises and sets north of the east and west points of the horizon*, will at once appear, by merely noticing the apparent path of the sun when it is at the tropic of Cancer.

To show the difference between the *sidereal and solar day*, let the arm of the Tellurian be directed toward the north, insert a pin at any point on the equator of the globe, let the pin be directed toward the sun (yellow ball,) which will be exactly south. Turn the globe once on its axis, at the same time moving the arm forward a short distance. When the pin is brought around toward the south it is not directed toward the sun as before, but must make a part of another revolution to come round in the direction of the sun. The first is the sidereal; the second, the solar revolution, or day. There will of course be one more sidereal revolution than solar in a year. As the earth is revolving on its axis, it is likewise revolving around the sun; hence, an entire diurnal revolution, which brings any locality under the same star, will not bring it into the same relation with the sun.

To show *the changes of the moon*, turn the arm so as to bring the moon between the sun and the earth. Evidently, the dark side of the moon is now toward the earth, and this is the position of the three bodies at *new moon*. By continuing the motion of the moon around the earth, more and more of that part turned toward the observer on the earth, will be illuminated, until it gets on the side opposite the sun, when it is *full moon*.

For many important illustrations that space will not here allow, the *Teachers Guide to Illustrations*, by F. C. Brownell, will be invaluable. S.

TEACHERS' INSTITUTES.

Written for the Voice of Iowa by J. L. Enos.

In another portion of the *Voice of Iowa*, this month, will be found calls for several of these valuable aids to the advancement of popular education in the State. The beneficial results arising from these institutions, when well sustained and properly conducted, are obvious to the most common observer; and of their utility as a

means of elevating and improving the character and value of our public schools, there exists no doubt among enlightened educators.

Their influence has been but slightly felt, as yet, in our State, but where Teachers' Institutes are regularly organized and held annually or semi-annually, the most triumphant success follows. By them the influence of a few good teachers—men of ability and experience, may be thrown over the whole State—diffused among the people and light caused to take the place of darkness.

Inexperienced teachers ought by all means to attend at least one session of an Institute before venturing upon the business of teaching. District boards will find it a good investment to pay the expenses of the teachers they think of employing, at an Institute of this kind. In most cases they will earn twice as much as they would to enter upon their labor without any such previous training.

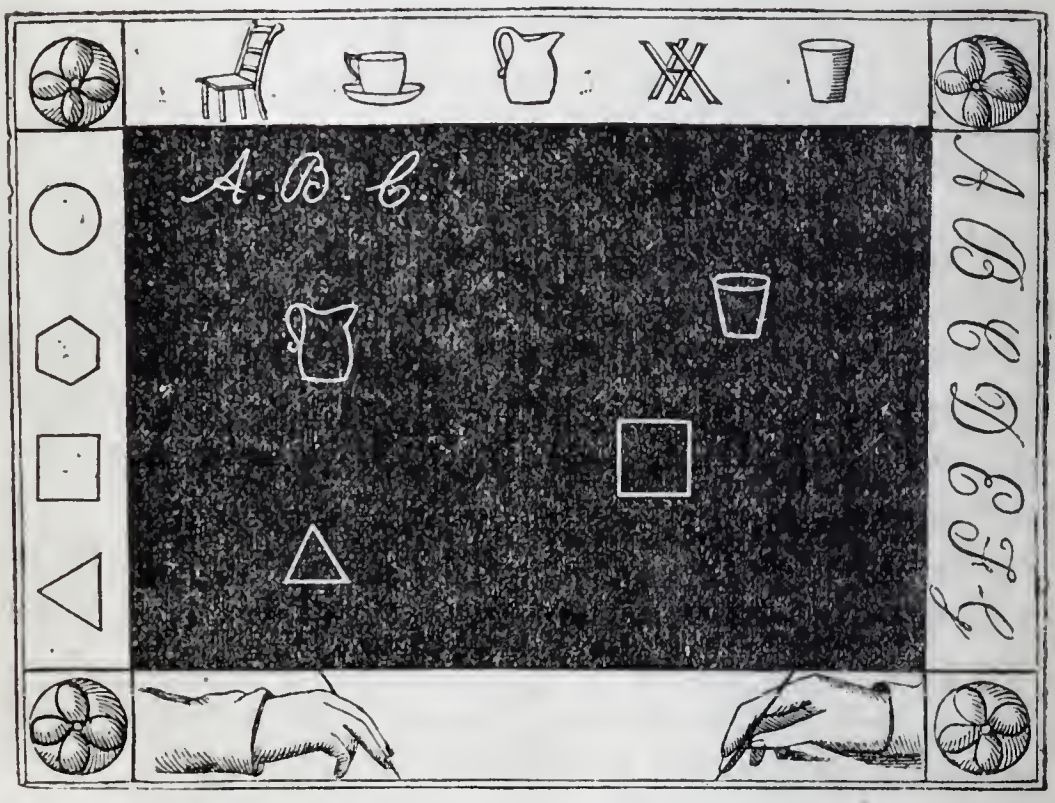
The expenses attending them must for the present be paid by individual effort where they are held, and by those who attend them as pupils. An effort will be made, with what success remains to be seen, to induce the Legislature at its next session to make an appropriation of funds to such counties as will raise a corresponding amount by subscription, or otherwise, to defray the expenses of a temporary Normal School in each of such counties a portion of every year. This will show the people of the State the importance of Normal Schools, and enable the State Institution to open under more favorable auspices, when it comes to be established upon a basis sufficiently broad to enable the friends of common schools to look to it for a supply of teachers for the graded schools of the State. This is about all the teachers one Normal School could ever furnish, and hence provision should be made for the permanent establishment of Teachers' Institutes to complete the demand of the smaller districts. The graduates of the Normal School should teach in the Institutes and give all the schools the benefit of teachers who have had at least a little training in the especial department of imparting instruction.

The public school teachers of Iowa are like those of other States, and though we find many of them doing an excellent work, the *normal* teacher will find many defects that might be easily eradicated by a little special training. Nor are our select and high schools, so far as our observation has extended, much in advance of the *commonest* schools. Parents must learn that if a man has found by experience that he has too little ability to preach, he is

also of too light a calibre for an instructor of any kind of a school. It calls for a better disciplined mind—for more varied knowledge—for a sounder scientific education, and more natural mental power, to complete and fulfill all that the teacher should be, than it does for him who is but to essay to minds whose characters and habits are already established.

The school must be elevated, and we know of no agency that can do this work so effectually as well conducted Teachers' Institutes in each of the more thickly settled counties of the State. We hope to treat this subject more at length in future numbers.

THE PRIMARY DRAWING SLATE.



We have introduced the above cut, which has been kindly furnished us by Messrs. Talcott & Sherwood, of Chicago, Ill., as an introduction to a few practical suggestions on the best methods of instructing, and at the same time interesting, and amusing, the children in our Primary Schools. The cut represents a Primary drawing Slate; it teaches the right manner of holding the pen; gives copies of writing letters, both small and capitals, furnishes

a variety of drawing copies; which are much extended in the Drawing Book prepared to accompany the slate; it answers every purpose of the ordinary slate; *and is noiseless.*

It needs no argument to show that the teacher should devise some method by which the children in our primary schools shall be released from the penance, they are compelled to do from nine o'clock in the morning, till four in the afternoon; and who will say it is not penance, to sit bolt upright on a slab bench all day, with feet perhaps swinging between the heavens and the earth, and nothing to do. Let the adult who doubts, try the experiment upon himself and we assert his conviction. How much more exquisit the torture when the yielding muscles and tender frame of childhood are the subjects.

Let then the seasons of relaxation be frequent, and in pleasant weather, insist on exercise in the open air; and while in the school room let every child be furnished with slate and pencil, and encourage them to draw. Give them such a slate as the one represented which has upon the frame, and they will amuse themselves for hours watching with delight, the picture as it grows under their pencil. Certain it is that drawing should come before writing, as better fitted to discipline the eye and hands, and prepare them for the subsequent practice in the copy book. We conclude our article with extracts which will show the value of drawing, as estimated by some of the best educational authority.

"Drawing should be tought simultaneously with writing; that as soon as the pupil can hold a pencil. It should be practised, at first, on the slate, on which the very youngest child may be usefully employed, in forming vertical, horizontal, and oblique lines, triangles, squares, rectangles, &c. Without drawing there can be no writing, was a saying of Pestalozzi; and though it is somewhat extravagant, it is to a great extent true. Writing is in fact, a species of linear drawing; and its acquisition is evidently facilitated by previous exercises in straight and curved lines, circles and ovals."

HINTS AND METHODS.

"In many schools, children are allowed to commence writing with pen and ink at two early an age. If, instead of this, they should be allowed to draw upon slates or black boards, such simple models as may be furnished, it would prove far more beneficial to them. Let them be allowed to copy letters in this way, as soon as they are

old enough to attend school; and after the lapse of two or three years, during which frequent attention may be given to such exercises, they will be prepared to commence the regular practise of writing under circumstances much more favorable."—*Northend's Teacher & Parent.*

The Slate is designed to combind the above suggestions, and the universal approbation of teachers, is a sure testimony of its adaptation to existing wants.

GOOD AND CHEAP ROOFING.

Although aside from the primary object of the *Voice*, at the request of a subscriber, we present this article in answer to his request to furnish him with certain facts as to the comparative worth of various kinds of roofs named. We have room for comments on one kind only, and were we to speak of others, so fas as our observation has extended, it would be only to condemn them in one or more particulars.

The cheapest roof that we are acquainted with, and one that we prefer to shingles, particularly as many shingles are now made, is covered with cloth. We know from an experience of more than fifteen years, that they are not only cheap, but good.

For the foundation for the cloth a substantial covering of boards should be laid, giving the roof any desired pitch, sufficient to run off the water. Cloth under the name of *Burlapse*, which is made of hemp, is the best for this purpose. It is woven from one to six yards wide, and is much used for oil floor cloths. That which is 1 1-4 yards wide is usually bought for about 15 cents per yard, but the widest is the best for roofing. It should be spread lightly over the roof and lapped at the seams and well tacked down with small pieces of cloth under the heads of the tacks; a few tacks should also be put in the middle to secure it from the wind until painted and finished. It should now receive a thick coat of paint; spruce yellow, or what is termed mineral or fire-proof paint, costing but a few cents per pound, with linseed oil, makes a cheap substantial paint. After the first coat of paint is laid on, small wood strips,

half an inch square, running up and down the roof, should be nailed on twelve or sixteen inches apart. Slim nails with small, neat points should be selected for the wood strips. Then one or more coats of paint should be applied. If the house is strong and the boards for the roof are well laid on, such a roof will out-last the common shingle roof.

SUGGESTIONS TO YOUNG TEACHERS.

A LARGE number of the Public Schools of Iowa are taught by young persons who have never received any regular training for the work they so often thoughtlessly assume. We call the attention of such to the following questions.

They should avail themselves of the experience of older and more experienced in the profession at all times and thus endeavor to become fitted for their work. The following suggestions are from the pen of that excellent teacher CHARLES NORTHEND, of New Britain, Conn. :

1. *Be interested in your work.*

So think, and speak, and act, that your pupils will see that your whole heart is in your work, and that you desire nothing so much as their improvement, morally, intellectually, and physically. Strive constantly and earnestly to inspire them with the right spirit, and lead them to labor diligently for their own advancement.

2. *Be punctual in your arrival at the school-room.*

It would seem hardly necessary to speak of this, but it is true that some teaehers are quite culpable in regard to their attendance at school. They seem to go reluctantly, and by their late arrival at the scene of their labors, they teach in the most effectual manner that punctuality is of no importance, and at the same time convey, in no unequivocal manner, the impression that they do not love their work. If you would have your scholars punctual and interested in their school, go early and with a cheerful countenance, which shall indicate that you feel a delight in your work and that the school-room is to you a pleasant spot. "*As is the teacher, so will be the school.*"

3. *Be dilligent in the school-room.*

Let your pupils see that while you require them to be industrious, you have no disposition to be idle yourself. Be active in your labors for them to feel that you desire nothing so much as their progress in all those things which will tend to make them more useful and happy. Let them see and feel that the school-room is the place for work both for yourself and for them.

4. *Have system in your plans and works.*

Many teachers fail of success from the want of system. If you would succeed and keep alive the right feeling, "have a time for everything, and every thing in its time." Let every scholar know what he has to do, and when it must be done. With system and order in your plans you may accomplish much, without them you can hope to do but little.

5. *Be sure that you have order.*

Without good discipline you can do nothing to advantage. "Order is Heaven's first law," and let it be yours. Let your pupils see that you wish them to do right, and that anything short of right action on their part will not be tolerated. But while you insist upon correctness of deportment, and sometimes inflict punishment for deviations, let it ever be with you a "better way" to lead your pupils to do right because it is right. Teach them to "love all that is lovely and of good report," and inspire them with a strong desire to form good habits of thought and action.

6. *Strive to awaken more interest on the part of parents, and if possible, secure their hearty cooperation in all your efforts.*

Those schools will be most successful and accomplish the most favorable results, where teachers and parents work together understandingly and cheerfully. Improve every suitable opportunity for convincing parents that you feel a deep interest in the work intrusted to you, and that you really desire, as well as need, their hearty cooperation. Visit them at their homes and induce them, if possible, to visit you in the school-room, that they may witness what is going on there. *As are the parents and teachers, so will be the results of the school-room.*

7. *Seek to improve yourself in every possible way.*

Read educational books and papers; write for your own good and the good of others; visit the schools of others; meet your fellow teachers monthly for mutual improvement; attend every meeting designed for the elevation of your profession, and "strive without ceasing," to make yourself better fitted for the discharge of your important and arduous labors. Labor faithfully and devotedly for the good of your pupils, and you will, in due time, reap a rich and satisfying reward.

AGRICULTURAL STATISTICS OF THE NORTH-WEST.

We observe in many papers of the country the most exaggerated statements of what may be expected from the forthcoming grain crops. If we were to believe them, we are to have nothing short of a deluge of grain, and the country is to be filled with garnered harvests of wheat and corn. Espesially is the North-West to be the great granary of the world—and all mankind are to come to Toledo or Detroit, Chicago or St. Louis, Dubuque or Burlington, to buy corn, as the Israelites went to Egypt. This is very natural when it is considered that we have just passed out of a period of starvation and several years of short crops; and it is now evident we shall have one really good crop. But exaggeration does no good; it does positive evil. The North-West will have a surplus. It always has had. But it will not have half the surplus which some of our fanciful cotemporaries have represented; and that it will not will be manifest on the consideration of certain facts.

1. All short or large crops are exaggerated. The shortest crop of grain in the West did not fall more than 20 per cent. below an *average* crop; and the largest one did not rise more than 25 per cent. above an *average*. If we take for wheat, corn and oats, 25 per cent. advance on an average crop, for the product of this year (1857), we shall come quite up to what may be expected.

2. The North-West as the great recipient of immigration, both from Europe and the Eastern States, increases faster in population than the whole country. Each annual wave of this immigration has to be fed one year without producing, and this makes a relatively larger proportion of consumers.

3. The North-West has arrived at a period when its *civic* or town population is increasiug at a very rapid rate; and this town population eat without producing. It will be within bounds to say that the *town* population of the North-Western States has increased 450,000 since 1850. Such a population requires a large amount of breadstuffs.

These facts go to show that the ideas entertained of surplus crops in 1857 are in many cases most grossly exaggerated. To set this matter in a true light, and yet give credit to every element of increase, we shall give a series of statistical facts which cannot be controverted, and from which reason may draw certain, inevitable deductions:

What has been the actual rate of increase in years past? We have before us the censuses of 1840 and 1850, with the estimates of the Patent Office, and the actual crops of Ohio and Iowa for the several years. These returns will enable us to give very nearly the grain production of the North-West for sixteen years—a period long enough to ascertain the rate of progress in production. In order to avoid the complication of naming each State, we aggregate the North-West; and by the North-West we mean the States of Ohio, Indiana, Illinois, Michigan, Wisconsin and Iowa, six grain-growing States, comprising, in all, about 300,000 square miles, and at the present time nearly seven millions of inhabitants. The following is the first table we give:

	Wheat.	Corn.	Oats.
In 1839	26,480,346	88,420,831	28,099,662
In 1848	47,800,000	170,000,000	62,000,000
In 1849	40,758,996	185,977,249	37,020,070
In 1855	60,037,662	282,572,562	56,054,341

Aggregating these results at each period, and we have the sum of three great crops of grain at four different periods during 16 years:

	Bushels.		Bushels.
In 1839	142,990,839	In 1849	263,561,335
In 1848	279,800,000	In 1855	398,664,575

The crop of 1849 was, in the States of Ohio and Indiana, a very poor one. The crops of 1855 were remarkably good. From 1839 to 1849 the aggregate crops of the North-West increased 84 per cent., or 8.4 per cent per annum. From 1849 to 1855 the crops increased 51 per cent., or 8.5 per annum. This shows a very uniform rate of increase; though if we consider that the crop of 1855 was a remarkably good one, it seems that the rate rather diminished than increased. We see no reason whatever to doubt that about the same ratio of progress in crops will continue for the present. In that case (since the crop of 1855 was a good one) the crop of 1857 will be about 16 per cent. advance on that of 1855. The aggregate of wheat, corn and oats produced in 1857, within the six North-Western States, will be about 464,000,000 *(four hundred and sixty-four millions)* bushels, certainly an enormous amount, but by no means equal to the marvellous statements made by some papers. The distribution will be something like the following:

Wheat, bushels	70,000,000
Oats, "	70,000,000
Corn, "	324,000,000

If this crop is produced, then the exports will be very heavy, and the railroads find ample employment for all their machinery. H.

PHONETIC DEPARTMENT.

ðɛ SΘNΘRΩ MɪNZ.

Wun ov ðɛ mΘst impΘrtant mɹnɪŋ kumpaniz in Amerikɑ at ðɛ prɛzent tɹm iz ðɛ SΘnΘrɑ Ekspl Θrɪŋ and Mɹnɪŋ Kumpani, ov Sinsinati, hwɪç has bin Θrganɹzd tu eksplΘr and purças gud Spaniʃ tɹtlz tu ðɛ riçest ov ðɛ mineral landz brΘt wiðin ðɛ limits ov ðɛ Yɥnɹted Stats bɹ ðɛ Gadzden Purças. ðis kumpani iz sed tu Θn 17,000 akerz ov mineral land kontanɪŋ sum fifti mɹnz, and iz nɛgΘʃiatɪŋ fΘr 200,000 akerz mΘr, ɛkwali valyɥable in mineralz, bɛsɹdz bɛɪŋ hevi timberd and wel wΘterd.

From ðɛ RɛpΘrt mad tu ðɛ stokhΘlderz, on Mɑrç 16, 1857, wɛ lɛrn ðat ðɛ Kumpani hav obtand pɛrfekt tɹtlz tu ɑ number ov ðɛ Θld Spaniʃ silver mɹnz, sed tu yɛld ten pɛr sent ov pɥr silver.

ðɛz mɹnz hav lan untuçt til ov lat fΘr meni yɛrz. Trapiʃon sez ðat ðɛ lɑst atemt tu wurk ðɛz mɹnz woz ŧɛrti-fɹv yɛrz agΩ, when ðɛ hΘl pɑrti wɛr kild bɹ ðɛ Ʌpɑçaz. ðɑr rΩind huts stil remɑn, and atest ðɛ fakt oʌ ðɑr fΘrmer okɥupaʃon. ðɛ sam fat mɹt Ωvertak ðɛ prezent pɑrti, but fΘr kumpaniz ov Yɥnɹted Stats DragΩnz staʃond in ðɛ visiniti.

ɑ siŋgɥlɑr insident gav rɹs tu ðɛ nam ov wun ov ðɛ mΘst impΘrtant ov ðɛz lΘkalitiz, ðɛ SalarΩ Θr sΘlt selɑr mɹn: Hwen ɑɛ BiʃΘp ov Tɥmasasori, ɑ miʃon ŧrɛ mɹlz sΘŧ ov Tɥbak, kam tu tak çarj ov hiz djΘsɛs' hɛ kΘmplɑnd muç ov ðɛ hɑrdʃips hɛ had tu undergΩ in ðis nΘrðern provins kΘmpɑrd wið ðɛ lukʃus fɑr and riç vɹandz ov hiz fΘrmer rezidens at ðɛ sΘŧ; and wun da at tabl sed hɛ had not ɛvn ɑ sΘlt selɑr tu hΘld hiz sΘlt. Wun ov hiz zɛlus pariʃonerz sed, "Wat until nekst Sunda, and ɹ wil briŋ yΩ wun." HɛimɛdiatlI rɛpɑrd tu ðɛ mΘntenz, and faʃond ɑ rΩd sΘlt selɑr from silver takn from ðɛ SalerΩ mɹn, hwɪç ɑrtikl in dɥ tɹm grast ðɛ BiʃΘps tabl, and gav its nam tu ðɛ mɹn.

ðɛ ajent ov ðɛ Kumpani rɹtiŋ from ðɛ spot sez, "ðiş trakt kontans mΘr mɹnz ðan eni uðer bodi ov land ov ðɛ sam sɹz in ðɛ teritΘri, and perhaps in ðɛ wurld; and it iz wel nΘn tu Ajor Emori, LΩtenant Mikler, Kurnel Gra aud Θl ðɛ militari and sɹentifik men hΩ hav vizited ðis kuntri. I wud not giv it fΘr ɑ Jɛrman dɥkdom, bɛkΘz it is rɛali and intrinsikali wurŧ mΘr, aud fΘr yɛrz, wil bɛkum mΘr and mΘr valyɥabl az dɛvelΘpments and biskuveriz ɑr mad."

Sum ɹdɛɑ ov ðɛ valyɥ ov ðɛz mɹnz ma bɛ fΘrmd from ɑ glɑns at hwot haz bin yɛlded bɹ ðɛ Meksikan vanz, hwɪç ɑr konsɛded tu bɛ inferior in ŧɛ kwolitt ov ðɑr Ωrz tu ðɛz. ZembranΩ pad $11,000,000 az hiz taks ov wun fifŧ ov ðɛ prΩsɛdz ov his mɹn. ðɛ mɹn ov ArivalΩ yɛlded $200,000 in ɑ pɛriod ov sevn wɛks, and anuðer van in ðɛ distrikt ov MΘrɛlos urΘdɥst $270,000 in abΘst ðɛ sam spas ov tɹm. ðɛ Biskɹnɑ van haz, sins it woz fΘrst Θpnd, nrΘdɥst at ðɛ lΩest estimat $10,400,000 wurŧ ov silver. Sum ov ðɛz mɹnz qr wurkt tu ɑ depŧ ov several ŧɛzand fet. If ðΩz in pozeʃon ov ðɛ SΘnΘrɑ kumpani run az ðep ða qr indɛd ɑ valyɥabl akwiziʃon.

EDITOR'S TABLE.

TEACHERS' INSTITUTES.—At the recent meeting of the Iowa State Teachers' Association arrangements were made for holding Institutes the coming autumn as follows:

Mahaska Co., at Oskaloosa.—This Institute will open September 14th, and continue in session for a term of two weeks, in charge of the following

Board of Instruction.—JAMES L. ENOS, Graduate of the N. Y. Normal School, Principal and Teacher of Elocution and Reading, and Theory and Practice of Teaching; W. B. LAWLOR, Teacher of Arithmetic, &c.; D. WILKINS, Teacher of GRAMMAR; E. E. TALCOTT, Teacher of Geography and Illustration; J. H. SANDERS, Teacher of Phonetics, Elements of Phonography, &c. Profs. Drake, Doig, Johnson and others, will assist in imparting instruction. Lectures will be delivered during the session by the following:

Hon. M. L. FISHER, State Superintendent of Public Instruction; Prof. R. WEISER, of Central College, Demoine; Prof. J. R. Doig, of Washington College; C. CHILDS, City Superintendent of Dubuque; and by others whose names we are not yet authorized to announce.

It is of the utmost importanee that Teachers attending the Institnte be present at the opening, as the classes will be arranged the first day and those who enter afterward must be behind during the entire session.

Those who eannot attend the whole term should be present the first week.

Each one should supply himself with a small pass book and lead pencil, and such text books as they may have.

This Institute will open at 2 o'clock on the 14th. The opening address and order of exercises for each day will be announced in the evening. Tuition will not exceed one dollar for each. Ladies boarded free—gentlemen at reduced rates or free.

Cedar County, at Tipton.—Will open the first Monday in November, at 10 o'clock, A. M. J. L. ENOS, C. C. NESTLEROADE, J. H. SANDERS, D. WILKINS, E. E. TALCOTT, Hon. M. L. FISHER, T. H. BOWEN, C. CHILDS, and others, will be present and aid in teaching and lectures. For full particulars see circulars, which will be sent to any one by their addressing C. C. NESTLEROADE, Tipton, Iowa.

Teachers will supply themselves as indicated in the call for Mahaska county.

Jackson Co., at Bellevue.—This Institute will open on Tuesday the 22nd of September, at Bellevue. We did not receive notice of this Institute in time to assign it a place in the regular series. It comes now the last week of the Mahaska institute. If it can be postponed one week later—a por-

tion of the Mahaska forces can be in attendance, otherwise we cannot be present as requested, and as we very much desire. Can you change once more to Sept. 29th? If so, please announce by circulars, at once, and we will be with you in any post you assign. Also draw on Messrs. D. Wilkins, E. E. Talcott, J. H. Sanders, &c.

The State Associations.—Our readers are aware that the second annual meeting of the Iowa State Teachers' Association, and the first annual meeting of the Iowa Phonetic Association, were held at Iowa City last month. Both were very largely attended, and from some circumstances attending them, were unusually interesting to the friends of education.

The presence of the State Superintendent—the full and frank maifestation, on his part, met with the same feeling by the teachers, for a deep and cordial co-operation in the means for the advancement of the cause of popular education in Iowa, unites the entire force and causes it to tend to one point. The presence also of between one and two hundred teachers, comprising the ablest educators in the State, all contributed to give this session an importance and an interest not hitherto experienced. The great work of the State is now fully commenced, and we think we hazard nothing in predicting that the next annual meeting of the Iowa Teachers' Association will be the largest educational convention ever assembled in the world. The convention to organize the Mississippi Valley Teachers' Association will be held immediately preceding. Davenport, the place of meeting, is central, not only for Iowa, but for Illinois and Wisconsin. From both these States, as well as from Missouri, Kentucky, Minnesota, Michigan and Indiana, we may expect large delegations.

The next number of the *Voice* will contain the proceedings in full, and we expect also, the able address of Prof. Weiser, of *Central College*, Des Moines. Extra copies will be supplied at the usual rates, if ordered prior to the 15th of September.

Gas Light.—*Andrews' Patent Self-generating Safety Gas Lamp.*—We are now enjoying the luxury of Gas Light—equal to any in use in our cities, and, what is better, it is the cheapest light we have ever used. Nor is this all. It is so constructed as to be perfectly safe. The flame does not heat the lamp nor its contents; it cannot therefore form the explosive mixture which causes the explosion of the camphene and burning fluid lamps. If the lamp be upset the flame is at once extinguished. If the screw top is taken from the lamp the flame is also extinguished, hence servants cannot fill these lamps by their own light. The importance of this subject demands more than a passing notice, and we invite any one who may be interested to call, and examine for themselves. It is economical, for it will afford more light than an ordinary wick lamp, and requires only three-fourths as much fluid.

This lamp will burn what is sold for Rosin Oil and Phosgene, as well as other fluids known as Ethereal Oil or Burning Fluid, &c., and 25 per cent. more economically than a wick lamp. In short, it is the cheapest artificial

light known except coal gas at less than three dollars per thousand feet, and cheaper even than that where the meters mark more than is consumed, as they are frequently said to do.

All this ought to be enough for one invention, but it is not all. This Gas Lamp burns no wick, though it has one as a conductor of fluid. It makes gas, heavy and light carburetted hydrogen mixed in different proportions depending on the combustible used. It burns gas, just as any city ga light burns, in jet, or several jets, bat-wing or fish-tail shape; and it burns all it makes as fast as it is generated. The Gas Lamp and burner are gas works in miniature, with all the necessary parts. The whole apparatus is brought into effective operation by means of silver conductors of caloric, so arranged as to convey the heat from the lower or blue part of the flame to the end of the vertical tube or retort, and this is surrounded by an air chamber which prevents contact with the lamp top, and with the fluid on its outside. This small apparatus is attached to any kind of lamp which will hold fluid, which lamp becomes the *gas house*, and the whole thing is thus perfectly portable, and may be carried in the vest pocket, making it a POCKET GAS LIGHT!

The fluid is put into the Lamp, a lighted paper is applied to the burner, and in 10 seconds or less the gas light is started, and continues till blown out or the fluid is exhausted. Every person thus becomes his own gas manufacturer, by being supplied with one of these Gas Lamps. No trimming required like wick lamps, no smoke, no smell, no trouble. A gas light in brilliancy, beauty, safety, economy, convenience and portability; and so cheap in "gas fixtures" that seventy-five cents to one dollar and a quarter will buy one affording the light of one foot to a four feet gas burner.

The U. S. Self-Generating Gas Light Co. have opened their store at No. 329 Broadway, for the purpose of introducing this new light, and for the sale of patent rights at minimum prices.

For particulars, application may be made to J. L. ENOS, Cedar Rapids, or to the Sec. U. S. S. G. G. L. Co. New York.

AMERICAN EDUCATIONAL YEAR BOOK, 1857.—This valuable work has been received and we call attention to it for the double purpose of commending it to the attention of every live teacher in Iowa, and of stating that the *American Educational Year Book* for 1858 is now in preparation, and will be ready to issue from the press early the coming autumn. Every teacher in Iowa who wishes his or her name enrolled in the *Teachers' Directory* to be contained in this work, should forward it at once to J. L. ENOS, Cedar Rapids, Iowa, and inform him how many copies to order. It will be an Annual worth possessing, and we trust several hundred may be ordered by the time the work is published. It is to be issued in the best Boston style, and furnished at the lowest price possible with its size. We shall forward the names of teachers sent us on the 20th of September. Orders for the work may also be sent to the publishers, JAMES ROBINSON & Co., Boston, Mass.

Correspondents and others must bear with us this month, as we have been absent in attendance upon the State Associations, and hence have been unable to answer many letters up to this time. In a few days we will be square again.

"F. P."—Enos' Mental Arithmetic is forwarded, post-paid, for 25 cents. You can enclose the money to us and it will be forwarded without delay.

"W."—Your letter came too late—Cedar Rapids is disposed of.

S. J.—We cannot publish your article, for we believe you have no real ground of objection to the individual named. He is not to blame for the acts of his predecessor, and you cannot try him by them.

"F. W. S."—The books were received.

"H. A. C."—Thanks for the catalogue, &c. Glad to find you enrolled among the gallant band of Illinois teachers.

"W. C."—I will forward your name for Godey's, Peterson's or Arthur's. Cannot inform you whether Graham is up to the times—think either of the others better. Have not seen it however for some months.

It will be noticed by the new advertisement of A. S. Barnes & Co., that Parker's New Readers are issued. As they are well spoken of, we should be pleased to be able to give them a more extended notice.

TEACHERS' DIRECTORY.

Embracing a List of the Teachers in the United States who are patrons of the Voice of Iowa.

Agents and others, in sending names of subscribers, will please write "T" after the name of each Teacher.

GENTLEMEN.

James J Pease,.....Davenport, Scott co.,.....Iow
Harrison Noble,.....Tiffin City,.....Ohio
B F Thayer,.....West Liberty, Muscatine co.,.....Iowa
J M Stone,.....Iowa City, Johnson co.,.....Iowa
F L Childs,.....Iowa City, Johnson co.,.....Iowa
James McClung,.....Tipton, Cedar co ,.....Iowa
W R Dawson,.....Ashland, Wapello co.,.....Iowa
Dr W Reynolds,.....Iowa City, Johnson co.,.....Iowa
E K Smith,.....Palestine, Johnson co.,.....Iowa
A W Geiger,.....Davenport, Scott co.,.....Iowa
Wm H Wilson,.....Washington, Washington co.,.....Iowa
Luther T Winter,.....Washington, Washington co.,.....Iowa
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Miss M T Townsley,.....Davenport, Scott co.,.....Iowa
" Childs,.....Dubuque, Dubuque co.,.....Iowa
" Mary P Scarborough,.....Tipton, Cedar co.,.....Iowa

LITERARY NOTICES.

LOVELL'S PROGRESSIVE READERS, in four numbers. By J. E. LOVELL. New Haven: Durrie & Peck.

We have received from the publishers this highly valuable series of readers. We have long known the distinguished author as a practical teacher of the first class, and have expected to find his Readers among the best works for schools. We have examined them with considerable care, for we do not mean to commend a poor book in the *Voice of Iowa*, and we are pleased to place this series high on the list of our best Readers. Mr. LOVELL has mingled with the young for so many years that he knows, perhaps as well as any other man living, what is demanded by the schools--for teaching reading. LOVELL'S series, as the name indicates, is progressive--the arrangement is well conceived—the type bold and clear—the material good; and the matter such as cannot fail to interest the pupil. They are meeting with a large sale. A few days since they were introduced into the public schools of the city of Baltimore. The 5th book of the series will be ready for the winter schools. Teachers will do well to examine this series when considering the question of a change of readers.

THE STAR OF THE WEST; or National Men and National Measures. By Miss ANNA ELLA CARROLL.

The political writings of American ladies have been more profuse of late years than formerly, and one idea seems to mark, them that gives us much hope in the future. They plead for universal *freedom*, and for the maintenance of the great AMERICAN PRINCIPLES. If our American matrons and daughters remain true to these grand ideas, our country is yet free from danger. Miss CARROLL has seen the dangers that beset our native land, and like a true guardian of truth and justice has sounded the alarm. Her articles in defence of Americanism are ably and fairly penned, and would have done no discredit to a masculine mind

The argument for a railroad to the Pacific, gives the strongest evidence of the practical mind of our author. The plan proposed is feasible, and the results prophesied in regard to the triumphs such an enterprize would achieve, are as certain to follow as the progress of Anglo-American civilization. Had we space in accordance with our desire, we should be pleased to extract liberally from the "*Star of the West.*" Miss CARROLL passed through our city a few days since, and informed us of her intention to visit Kansas the present season—to take notes, etc. A work on Kansas, at this time, from her pen would be of value. Should one appear, we speak for an early copy.

THE SOUTHERN PLANTER. Richmond, Va.: FRANK G. RUFFIN, Editor. $2.00 a year Monthly.

Our Northern Agriculturists flatter themselves that they are far in advance of their Southern brethren in everything pertaining to correct, scientific farming. If, however, the press devoted to that subject is to be taken as an index to the truthfulness of the statement it may well admit of discussion, to say the least. The number of the Planter before us is a mine of wealth for any latitude, and if every number is as good, or even half as good, it is a work of too much value not to have an extensive circulation among the intelligent farmers of Iowa. We hope our good brother RUFFIN will send us the numbers of the present volume from 1 to 7 inclusive, as we wish the volume complete for binding, and a valuable one it will be. Address, RUFFIN & AUGUST, Richmond, Va. Specimens may be seen at this office.

NEW ENGLAND FARMER. Weekly—Boston: JOEL NOURSE, Publisher; $2.00 a year. A Monthly, devoted entirely to Agriculture, is published at the same office at $1.00 a year.

The reputation of this long established journal is too well understood, to need lengthly commendation from us. It is now nearly thirteen years since it was first commenced and had it been anything less than a first class journal, it never would never have lived to enjoy a weekly circulation of 17,000, as at present. We gladly place it on our exchange, and trust we may long enjoy its weekly visits.

THE COMMON SCHOOL GEOGRAPHY: Mathematical, Physical, and Political—By D. M. YOUNG. Philadelphia: H. COWPERTHWAIT & Co.

This must become a popular book. It is a plain, practical—neat work. The engravings and maps are excellent and the print clear. The subjects are clearly treated, unobstructed by a gestion for every fractional idea sought to be advanced by the author. We like this feature. The map of our own State is nearly correct—though we notice our own city is on the wrong side of *Jordan*. We trust it will receive a sale commensurate with its worth.

EMMERSON'S U. S. MAGAZINE.—The August number of this superb Magazine has reached us —filled as usual with matter that justly entitles it to the position it is so rapidly acquiring as the leading Magazine of America. We are *minus* the July number. Will the publisher do us the favor to forward it, and may the Lord have mercy on the hardened Post Master, whoever he is, that dares again take from its course the U. S. Magazine directed to the *Voice of Iowa*.

STATE UNIVERSITY OF IOWA,

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FACULTY.

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This institution has been so organized as to meet the wants of all classes as far as practicable.

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No pains have been spared in securing the services of able Professors, who will do all in their power to give character and worth to the University, and render it a desirable institution.

An extensive Library and apparatus have already been procured, so that in these respects, the University will compare favorably with older institutions of the same rank.

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The University year is divided into two terms of twenty weeks each. The first commences on the THIRD WEDNESDAY OF SEPTEMBER; the second on the SECOND WEDNESDAY OF FEBRUARY.

EXPENSES—The fee payable for tuition is ten dollars per term. No other charge is made.